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THAILAND'S NORTHEAST PROVINCES: AN ECONOMIC SOFTSPOT

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THAILAND'S NORTHEAST PROVINCES:
AN ECONOMIC SOFTSPOT*

Summary

The Northeast region, encompassing one-third of Thailand's national territory and one-third of its population, is the poorest of the four regions of the country and has a per capita gross domestic product (GDP) of little more than one-half the national figure. This poverty, plus a traditional isolation of the Northeast from the rest of Thailand, has given rise to a threat of political disaffection by the region. The security problem of the Northeast is of long standing but has increased recently because of political developments in the region and in neighboring countries. Even though political apathy is the general rule at present and Communist front organizations have as yet found no broad-based support, there is evidence of an intensified subversive effort. The formation of several Communist front organizations and an increase in terrorist and propaganda activities, for example, indicate that subversion has become better organized and more aggressive. Propaganda includes criticism of the Thai government for the economic hardships of the region.

Subsistence agriculture is the way of life in the Northeast, with almost 90 percent of the people engaged primarily in agriculture on small plots using traditional labor-intensive methods. Because of unfavorable soils and inadequate water control, the agricultural output of the region compares unfavorably with that of the nation as a whole. Three-fourths

* The estimates and conclusions in this report represent the best judgment of this Office as of 1 December 1965.

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of the farmland of the region is devoted to rice, but yields are only 62 percent of the national average. Maize has become an important export crop for Thailand, but even though production has expanded in most of the country, it has actually declined in the Northeast. A similar pattern exists for cotton. Production of kenaf (a fiber plant similar to jute) has been expanded greatly in the Northeast, but it remains a relatively unimportant crop, and substantial increases in production are not expected.

Much of the economic poverty of the Northeast can be traced to the natural conditions of the region, and these conditions will prevent an easy solution to its economic problems. Mineral resources are limited and provide no natural base for industry. Soil conditions are poor, and the monsoon climate and flat terrain combine to produce alternating periods of excess and deficiency of water. Traditional agricultural techniques that have developed in response to these natural conditions are not conducive to substantial expansion of production.

The government's development program, in recognition of the particular economic and political situation in the Northeast, has centered special attention on the region. It is hoped that an expansion of transportation and water control systems, along with the introduction of improved materials and methods of cultivation, will substantially improve productivity. Even through improvement is possible, the region's agricultural potential probably will remain below that of other parts of the country. Given the existing limited base and the necessarily long-term nature of the government's programs, no appreciable increase in incomes will be realized in the near future by most of the farmers in the Northeast. To bridge the gap between initiation of programs and realization of results and to help meet the immediate political need to demonstrate the government's interest in the area, a Mobile Development Unit (MDU) program has been undertaken. Still a small-scale effort, this program consists of sending teams through the villages in assigned areas to conduct political, social, and economic programs at the village level. The program is designed to encourage local initiative in development by demonstrating the benefits of digging wells, employing improved techniques of cultivation, and practicing better standards of health and sanitation.

Thailand is participating in the long-range international effort to develop the Mekong River Basin, and the Northeast will derive many benefits from the execution of the program. At present, Thailand is building two tributary projects in the Northeast to provide power and irrigation for the region.

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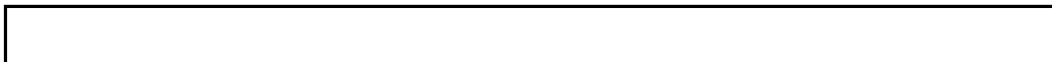
I. Introduction

The Northeast region of Thailand is comprised of the Korat Plateau, which is separated from the rest of the country by mountain ranges. (For a map of the Northeast, see Figure 1.) The region has long remained somewhat isolated from the rest of the country, in spite of its large size and its fairly large share of the country's total agricultural production. Lack of natural resources and the unfavorable conditions for agriculture have made the Northeast the poorest region in Thailand, with a per capita GDP of about \$60, only one-half the national figure. The population of the Northeast, according to the 1960 census, totaled about 9 million, or just over one-third of the country's population of 26.3 million. 1/* The area of the Northeast is also about one-third of the national total, and the population density in 1960 was 53 persons per square kilometer. Given Thailand's relatively high population growth rate of 3.1 percent per year, the population in the Northeast in 1965 may be estimated at 10.5 million.

Traditional subsistence agriculture is the way of life of most of the people in the region. In 1960, 88 percent of the population was engaged primarily in agriculture, compared with 74 percent nationally and only 53 percent in the better developed Central region of the country. 2/ The requirements of agriculture have contributed to a concentration of population in the broad valleys of the Mun and the Chi Rivers, which drain about three-fourths of the water runoff of the Northeast.

Traditionally relying on higher levels of government to provide leadership, the villager often displays a lack of initiative in overcoming his problems. He also exhibits a reluctance to accept substantial changes in his way of life to improve his lot. Nevertheless, land fragmentation caused by overpopulation has been avoided in areas near the rivers by population migrations motivated by economic considerations. Such movements have generally occurred out of the overcrowded Mun and Chi Valleys, where rice yields are low, to more northern provinces where availability of better land results in higher rice yields. Nevertheless, the general reluctance to make such a change is indicated by the 1960 census. The migration rate for the Northeast is the lowest of Thailand's four regions, only 9 percent of the people having moved from the province of their birth. Moreover, the share of the migrants who left the region -- 20 percent -- is the lowest for the four regions, and the Northeast has experienced only a small net migration outward. 3/ Thus spontaneous migration cannot be expected to ease the low standard of living in the Northeast, and the tradition-bound inhabitants will have to be helped within the region itself.

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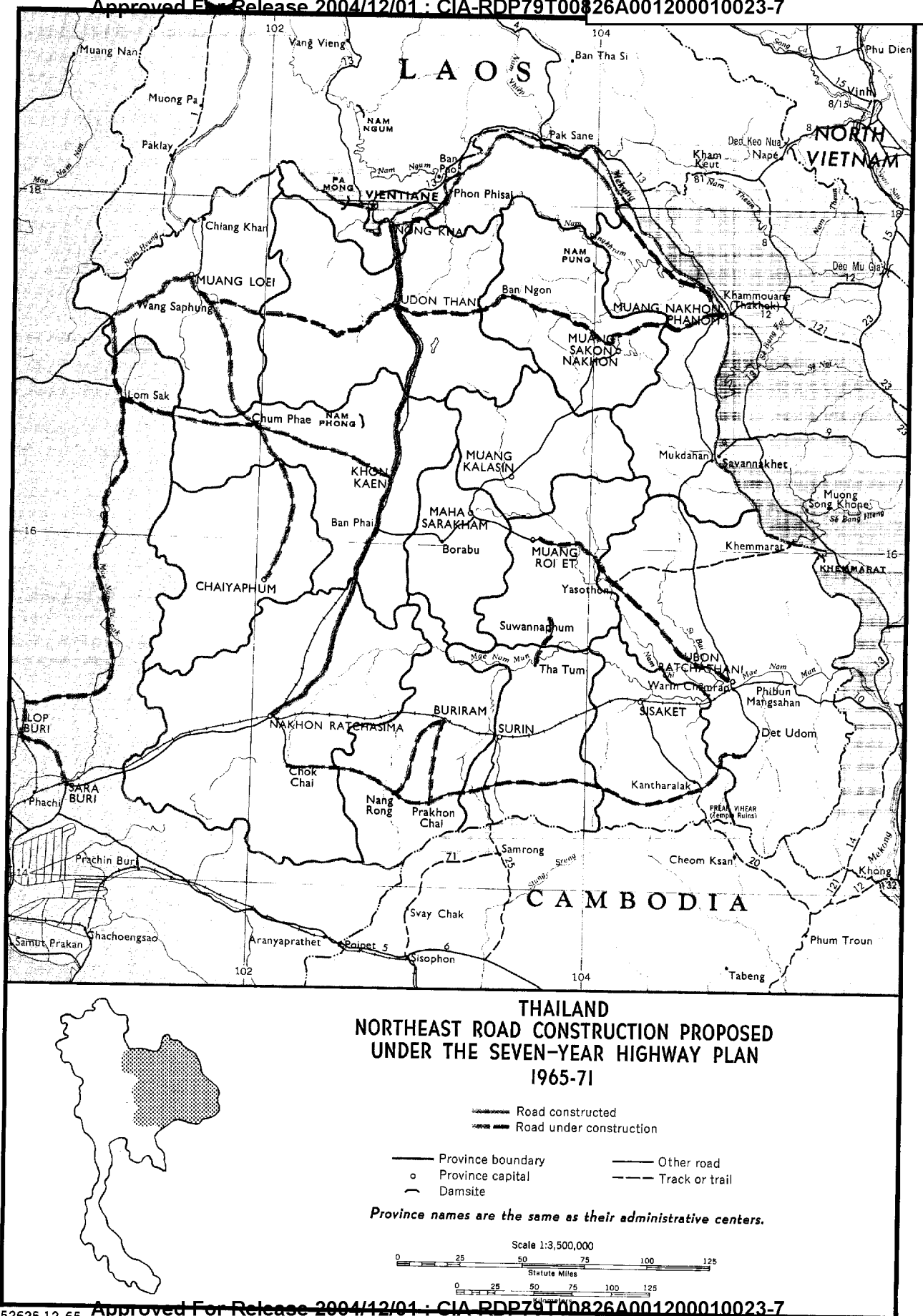


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Another response to economic considerations, although a short-sighted one, has contributed to the low level of education in the Northeast. The villagers generally have had at most a compulsory four years of education beginning at age seven. This training has made three-fourths of the populace officially literate, but many have lost the skill from lack of use since leaving school. Very few persons go on to secondary education, largely because the advantages to be derived are considered small compared with the benefits from performing productive work on the family farm plots. In 1961, only about 6 percent of the Thai students who had completed preuniversity training were from the Northeast region.

Reliance on traditional agriculture in the unfavorable setting of the Northeast has made it the poorest of Thailand's four regions. In 1963 the Northeast accounted for only 18 percent of Thailand's GDP, and even this amount represented a small decline from its share in 1960. 4/ On a per capita basis the Northeast's GDP is little more than one-half the national figure and less than one-third that of the Central region. These low figures must be qualified by noting the marked difference in circumstances of people who live in towns and those who live in villages. The former has an average per capita income of \$125 per year and in many cases enjoys a standard of living comparable to that of a resident of Bangkok. Villagers, on the other hand, comprising more than 90 percent of the total, earn a total per capita income of only \$43 per year. 5/ Such low incomes do not imply anything like starvation, for the subsistence farmer can generally provide adequately for his family's needs. They do mean, however, that the village family enjoys few amenities of life. Virtually everyone in the village, for example, drinks untreated water from a canal, only 10 percent have any sanitary facility, and 0.3 percent have electricity. 6/ (By comparison, 67 percent of people in towns in the Northeast and 94 percent of Bangkok residents have electricity.)

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II. Government and the Threat of Subversion

Poverty, ignorance, and lack of favorable contact with the government have created in the Northeast what the Thai government believes to be a situation ripe for subversion. Although most Northerners are politically apathetic and there appears to be no broad-based support for existing subversive groups, much of the government's development effort in the region can be traced to a concern for a potentially threatening political situation. The increased attention of the government to the region, in recognition of its exposed position to Communist action in Laos and elsewhere in Southeast Asia, contrasts with a long-standing neglect of the region.

One noneconomic factor that appears to have contributed to the alleged political instability in the Northeast is the structure of the Thai government. Initiative descends from Bangkok, and it is difficult for villagers to convey local requests to responsible high-level officials. Provincial governors in Thailand are appointed out of the Ministry of the Interior and are responsible to the Ministry. Beneath the governor of the province are the district officers, also appointed by and responsible to the Ministry of the Interior. At the lowest level, village headmen are elected, and they in turn elect the commune headman over a number of villages within a district. These elected officials must convey their constituents' needs to the district officers and win local adherence to government directives. Established procedures exist for transmitting directives downward, but local villagers seldom encounter a government official with sufficient authority to give them satisfaction in their requests. The National Police have much autonomy within the Ministry of the Interior and often have abused their authority at the village level. Understaffing has made it impossible to give remote villages adequate police protection. Thus the villager's contact with government officials has been limited and, where it has occurred, often unfavorable.

The cultural ties of many Northerners with their neighbors in Laos has taken on new significance for the Thai government in light of the subversive threat posed by developments across the Mekong River. The Northerners speak a dialect different from that of central Thailand and similar to that of southern Laos. These cultural and linguistic similarities and ease of movement across the Mekong have oriented many of the border residents more toward Laos than toward the rest of Thailand. Thus foreign agents, propagandists, and other subversive influences have easy access to the people of the Northeast.

Of immediate concern to the government is the presence of about 40,000 Vietnamese refugees in the Northeast. Most of these entered Thailand late in the 1940's to escape the fighting at home, but they remain devoted to Ho Chi Minh and are under the influence of Communist Viet Minh cadres. These refugees have been content to remain

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in their areas of concentration in five Northeast provinces: Sakon Nakhon (5,000), Ubon Ratchathani (4,000), Udon Thani (5,000), Nong Khai (12,000), and Nakhon Phanom (10,000). 7/ Their presence in such centers of subversion as Nakhon Phanom has been of continuing concern to the authorities.

About 35,000 of the original 75,000 refugees were repatriated to North Vietnam between 1959 and 1964 by agreement of the two governments. The North Vietnamese government suspended the program in August 1964, ostensibly because safe movement of these people could no longer be assured. Thai authorities are concerned that the remaining communities are being used by agents infiltrated back into Thailand after repatriation and training in North Vietnam. In spite of this concern, the government is reluctant to undertake a costly relocation of the refugees because they have so far posed no overt difficulty.

Communist activity in the Northeast and the rest of Thailand has a long and unsuccessful history and antedates the efforts of Ho Chi Minh to promote its cause in 1928, when he was a refugee from Indochina. The Communist effort in Thailand has been firmly suppressed whenever its agitation became widespread. The Communist Party of Thailand and the Chinese Communist Party of Thailand were forced underground early in the 1950's, and Communist leadership was dispersed. Nevertheless, Communist activities continued on a small scale into the 1960's through such fronts as the Solidarity Movement centered in the Northeast Province of Sakon Nakhon. Early in the 1960's, approximately 200 Northeast youths reportedly were recruited by leftist elements for military training in Laos. Also during this period evidence of skillful propaganda activity was discovered.

Subversion in the Northeast has been stepped up recently by the formation of new front organizations that have been openly encouraged and apparently guided by North Vietnam and Communist China. The latter country recently related its support of subversion in Thailand to Thai support of the US effort in Vietnam. 8/ In December 1964 the Voice of the People of Thailand, a Communist clandestine radio station that has operated out of Laos or North Vietnam since 1962 announced the formation, on 1 November 1964, of the Thailand Independence Movement. 9/ In January 1965 it announced the formation of the Patriotic Front of Thailand. Both organizations included among their stated objectives the overthrow of the Thai government and the destruction of "US imperialism." In November 1965 the Thailand Independence Movement merged with the Patriotic Front of Thailand. Subsequently, other fronts were announced for various Thai groups such as lawyers, priests, and workers. Propaganda of various kinds includes criticism of the economic hardships of life in the Northeast and blames conditions in large part on neglect of the region by the government.

There is no evidence that these fronts have yet received much broad-based support, but terrorist acts have occurred, including the assassination of a number of local officials and police informers,

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III. Potential for Agriculture

The Northeast will remain almost exclusively an agricultural region for many years, a prospect recognized in Thailand's development planning. Given the physical environment and the traditional methods of agriculture in the region, it is unlikely that a substantial improvement in incomes will occur until a long period of intensive effort and broad change has elapsed.

A. Conditions of Agriculture

A major deficiency of the Northeast is its generally poor soils. The infertile sandstone soils have suffered from the intense weathering action of the tropical climate and from intensive cultivation. Much water flows in the rivers during the rainy season, but the major rivers originate in sandstone hills and so contribute little to the restoration of depleted soils. Flood waters collect in many shallow depressions called "tungs", but the silt deposited in these hollows is conducive to the growth of little besides coarse grass. Fertilizers are little used, and traditional attempts to overcome the deficiencies of the soil include such practices as flattening large termite nest mounds and employing the heavier soil brought up from greater depth in small plots to grow local fruit crops.

Another problem faced by the farmer is that of insufficient water. Because supplies of ground water are inadequate for more than domestic use, water for agriculture must come from local rainfall and the rivers. The Northeast shares Thailand's monsoon climate and also experiences the effects of tropical storms from the east. Consequently, rainfall is erratic in amount and uneven in distribution. The shallow soils themselves do not hold water well, and runoff is high. The terrain of the Northeast is flat, and the swollen rivers flood extensive areas. Annual floods cause substantial damage to roads and crops. The shallow tungs ease the flooding problem somewhat by holding water back behind natural levees, but subsequent drainage and evaporation leave these dry in the dry season. Even the main rivers are reduced to low levels and sluggish flow when the rainy season is over.

The traditional pattern of cultivation is yet another hindrance to agricultural productivity. The farm plot is typically only a few acres, worked by an individual family unit on a labor-intensive basis. Commercial farming exists only on a limited scale in certain locales, such as in the sugar cane growing areas in Udon Thani and Nong Khai Provinces. Paddy cultivation in the crowded river regions has been pushed to marginal lands, which receive insufficient water and at the same time deprive lower land of necessary water runoff. Fertilizers are very little used, in part because they are uneconomic at the present prices of fertilizer and rice. One of the most damaging practices, common in the Northeast as in other parts of Southeast Asia, is shifting

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cultivation. Forest areas are burned off to provide both space and a natural fertilizer for growing upland crops. These crops deplete the soils rapidly and cause the destruction of large areas of forest. Within two or three years, production must be shifted to another location.

B. Principal Crops

Growing rice dominates the economy of the Northeast. Of 4 million hectares estimated to have been devoted to farm use in 1963 (one-fifth of the total area of the Northeast), about 75 percent was planted to rice -- the highest percentage of the four regions in the country. ^{11/} Local tastes in the region favor the glutenous variety of rice over non-glutenous, and most of the rice grown is of the former type. The demand for glutenous rice on the international market is relatively small.

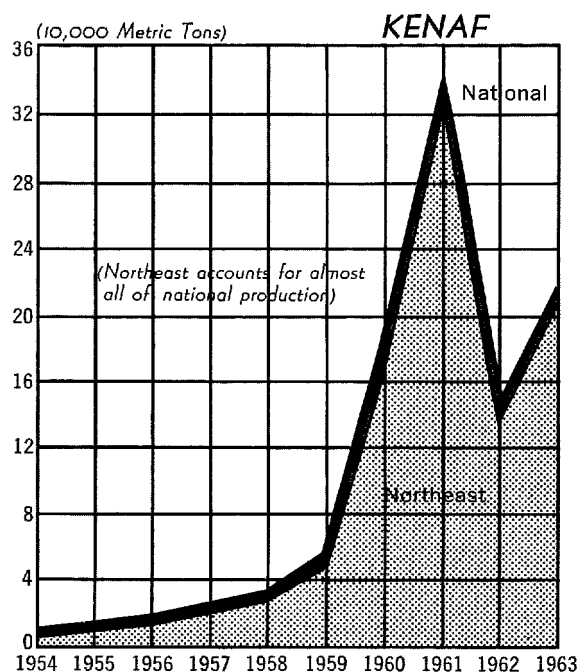
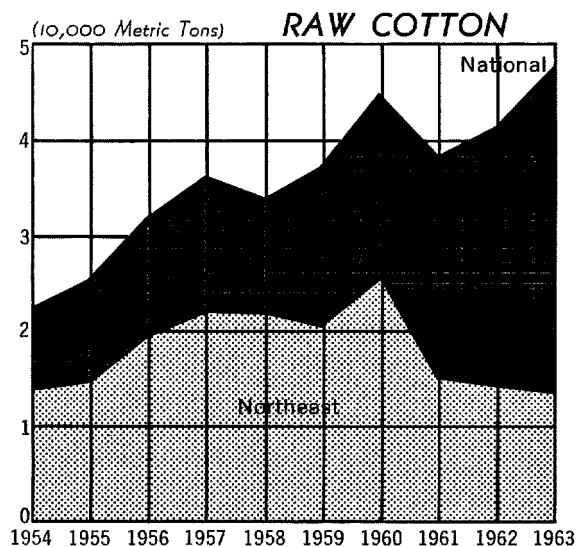
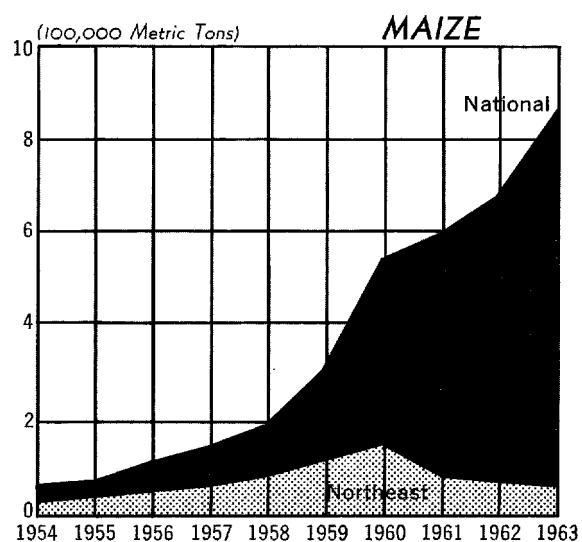
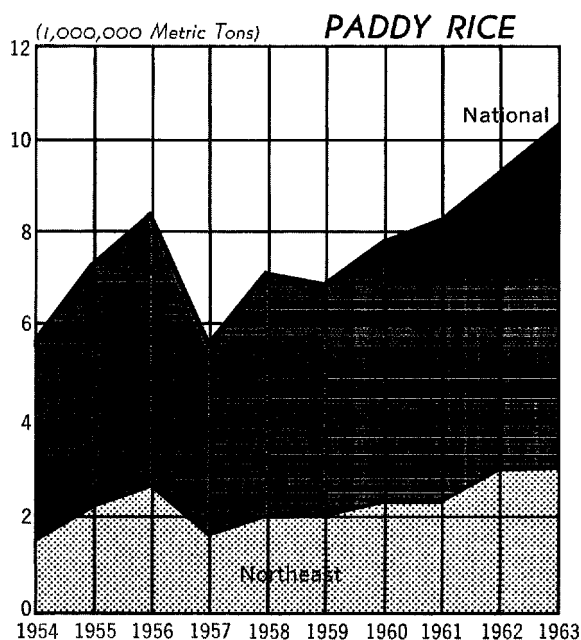
Much of the land in the Northeast is not well suited to growing rice, but the Northeasterner is slow to alter his traditional way of life. In 1963 the paddy yield was only 1,100 kilograms per hectare planted, whereas that of the Central region was 1,780 kilograms per hectare planted (only a fair yield by world standards). ^{12/} From 1950 to 1963, the area planted to rice in the Northeast had increased one-third, the largest increase in any of the four regions of Thailand. Thus in 1963 the Northeast accounted for 41 percent of the total rice area in the country but only 30 percent of its rice production. The value of rice and other crops produced in the Northeast compared with Thailand's national production in 1963 is shown in the table. Comparison of the volume of Thai national production of selected crops with that in the Northeast region during 1954-63 is shown in the chart, Figure 2.

Even though production of crops other than rice has increased substantially in the Northeast during the past decade, as it has in the whole of Thailand, the Northeast generally shows up poorly in comparison with the rest of the country. Under a government program to encourage agricultural diversification, the share of commodities other than rice in total national agricultural production has failed to increase, but upland food crops have grown relatively at the expense of other non-rice categories from 9 percent of the total in 1957 to 19 percent in 1963. ^{13/} The Northeast has maintained its important share in producing fruit -- one of the upland food crops -- but has performed poorly in producing maize, a crop that has increased greatly in importance and in 1963 became Thailand's third largest export. The national acreage planted in maize rose from 43,000 hectares in 1950 to 423,000 hectares in 1963. The Northeast's share of the acreage, which was 31 percent in 1950, was only 9 percent in 1963, and the Northeast's acreage has declined absolutely by one-half since 1960. ^{14/} Moreover, although the yield in the Northeast exceeded the national figure in 1950, it fell below it in 1963, as Northeast yields doubled in the period and national yields tripled. Consequently, the region produced

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PRODUCTION OF SELECTED CROPS IN THAILAND AND ITS NORTHEAST REGION

1954-63



Value of Production of Selected Crops in Thailand and Its Northeast Region
1963

Commodity	National Production (Million US \$)	Northeast Production (Million US \$)	Northeast Production as a Percent of National Production
Rice	466.5	138.8	30
Maize	43.7	3.3	8
Sugar cane	29.6	6.4	22
Fresh fruit	75.8	24.9	33
Coconuts	37.7	3.9	10
Cotton	7.8	2.2	28
Kapok and bombax	18.6	9.1	49
Kenaf	27.8	26.8	96
Tobacco	22.4	5.8	26
Total value of selected commodities	<u>729.9</u>	<u>221.2</u>	30
Total value of Thailand's agricultural production	1,233.0		
Thailand's gross domestic product	3,250.5		

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less than 8 percent of the national production of maize in 1963. One reason for the decline in the Northeast appears to be the marketing difficulties arising from the geographic dispersion of maize growing.

In several other crops the performance of the Northeast has been deficient in some respects. For example, in growing coconuts the Northeast has expanded plantings much more than has the rest of the country, and in 1963 plantings were thirteen times those of 1950. ^{15/} But production is lower per planted unit in the Northeast, and this region contributed only 11 percent of the volume of national production in 1963. Cotton is a much less important crop in Thailand but is one in which the government has expressed some hopes for the Northeast. The Northeast rate of yield is somewhat better than that for other parts of Thailand, but production has been curtailed in the region because the low quality of Northeast cotton has contributed to marketing difficulties. Planting cotton has doubled in Thailand since 1950 but has actually declined in the Northeast. There the area planted to cotton fell from 60 to 25 percent of the national total during 1950-63. ^{16/}

The pattern for kenaf illustrates both the potential and the limitations of agricultural diversification and expansion in the Northeast. Until 1960 the production of kenaf, a near substitute for jute, was negligible in Thailand, but favorable market conditions since 1960 have encouraged its expansion. The area planted to kenaf, virtually all of it in the Northeast, was tripled in 1960, compared with 1959, and was almost doubled again in 1961. ^{17/} In 1961 the value of kenaf produced in the Northeast was almost one-half that of paddy rice. High prices on the world market led to overproduction, and, when the price declined in 1962, production was sharply reduced. The area planted was only about 40 percent of that planted in 1961, and production declined 60 percent in volume and 75 percent in value. Both the price and volume rose in 1963, so that the value of production was comparable to that in 1960; volume increased 13 percent in 1964 above 1963, and the outlook for 1965 is for a further substantial increase. Price has been the key determinant in these marked fluctuations in production.

This pattern suggests that Northeastern farmers are ready to respond to favorable economic incentives and that, in some cases at least, marked production increases are possible within a short period. Sales of kenaf, however, are heavily dependent on foreign markets, and, compared with India and Pakistan, Thailand remains a very small producer, so it is not clear how market conditions will develop in the future. As kenaf accounted for only 2 percent of the value of Thailand's agricultural production in 1963, no substantial increase in the Northeast's GDP is likely to occur from this source. Yet the rise in kenaf's share of all crops from 0.1 percent to 2 percent in a decade is itself impressive and suggests the possibility that other new crops may become important to the Northeast in the future.

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IV. Potential for Industry

The present industrial base of the Northeast is negligible, and prospects for a significant expansion are dim. Transportation to distant markets is costly, and the region itself has limited purchasing power. The known resource base of the region is limited, labor skills are at a low level, and living conditions are not attractive to outsiders who might be desired for a skilled labor force.

The completion of the Nam Pong and the Nam Pung Dams in 1965, along with existing powerplants throughout the Northeast, will provide a substantial surplus of available power for a long time to come. The region's power distribution system is undeveloped, and the transfer of power over long distances to limited markets is likely to be costly.

The transportation network of the Northeast is deficient in many respects but is unlikely to be a critical barrier to industry. One railroad runs eastward from Bangkok across the southern part of the Northeast to Muang Ubon, 48 kilometers from the southern border of Laos near Pakse. Another railroad provides a connection from Bangkok (branching off from the east-west route at Nakhon Ratchasima) to the Laotian border at Nong Khai near Vientiane, Laos. A new highway, financed in part by US aid, parallels this latter railroad. Other major highways provide links across the northern and western sections of the region.

The Thai government hopes that substantial mineral deposits will be found in the Northeast and plans to make surveys to locate exploitable deposits. Foreign companies are welcome to prospect for oil, and at least one application for exploration rights is being considered at present. The known mineral deposits are minimal. Small quantities of manganese are mined in Loey Province, but known deposits of lignite, iron, and copper are too small for commercial exploitation. The Northeast contains one of the world's largest deposits of rock salt, but salt requirements for related chemical industry can be obtained more economically from sea water.

Thus, other than cheap land, the Northeast, compared with other parts of Thailand, has little to offer industry. The development plan for the Northeast suggests that 20 large-scale industries are feasible, ranging from ore smelting to manufacture of textiles and plastics, but even this plan expresses little optimism concerning an early realization of the government's hopes. ^{18/} The most feasible course for the region would appear to be the development of small-scale industry, primarily that directly related to processing agricultural products, such as milling of rice, which is already being done. The direction such activities might take is suggested by plans to encourage expanded production of silk in the Northeast, weaving the high-quality Thai silk that is traditionally produced on a small scale by Northeast farmers. Demand for Thai silk is strong at present, but prospects

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for increasing production from its present low commercial level are poor, because low returns and the difficulties of raising silkworms in the Northeast have caused the decline of sericulture over a long period. If production of cotton can be increased, and quality improved, it may be possible to establish a significant cotton textile industry in the future.

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V. Northeast Development Plan

The development plan of the Thai government for the Northeast, a five-year program covering 1962-66, was drawn up to specify the region's share of the National Economic Development Plan, covering the six-year period 1961-66; as such it reflects the same goals and priorities as the National Plan. Thailand's planning assumes that development will take place in an atmosphere of free enterprise, and consequently it projects specific expenditures only for the public sector. The plan's projected production levels for agriculture, being rather unambitious extensions of production trends late in the 1950's, generally have been exceeded. The target of a rate of growth of 5 percent per year for GNP also has been realized during the past few years. The Thai planning effort is rather unsophisticated and consists primarily of listing very general goals and specific projects. It recognizes the problems faced in the Thai economy but fails, in the words of the revised National Plan, to treat "the establishment of the functional relationships among projects, policies, measures, and anticipated targets both for individual sectors and for the economy as a whole" 19/ Basically, the Thai government is attempting to concentrate its development efforts on the building of an infrastructure that will be conducive to expansion by the private sector in industry and agriculture.

The government is aware of the economic poverty of the Northeast compared with the rest of the country and of the political and social problems that in some degree are unique to the region. Consequently, the government in its planning has attempted to give special consideration to the Northeast. The Northeast Plan scheduled a total spending of \$288 million, equivalent to 29 percent of the \$1 billion scheduled under the National Plan in its original form. 20/ The Northeast Plan appears to address itself appropriately, if perhaps on too limited a scale, to the problems of the region. About one-half of all expenditures are to be devoted to transportation, communications, and power. Another one-third is to be spent on agriculture, including irrigation projects and other efforts to overcome the acute shortage of water in the region. The remainder of the expenditures are to cover community services, health, and education.

Both the National and the Northeast Plans depend for success on large infusions of outside financing. The Northeast Plan, for example, anticipates that almost two-thirds of the total expenditures will be financed by foreign loans and grants, the latter to be limited to technical assistance and to projects having defense functions. Thailand is experiencing some difficulty in meeting its investment targets because of problems in negotiating foreign loans in time to permit completion of construction within the Plan period.

Thailand has placed a great deal of emphasis in its development planning on the expansion and improvement of its transportation network. In the Northeast, even the major highways have been

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substandard. The minor roads are often impassable in the rainy season, leaving many small villages virtually isolated. The Northeast Plan specifies the construction of almost 1,000 kilometers of major roads and the improvement of 1,500 kilometers of major roads. 21/ Some modification of the plan has occurred, reflecting revised financial and security priorities, but the overall program is proceeding fairly well. Of the major routes, the highway from Nong Khai to Nakhon Ratchasima (Korat) was opened in January 1965. Construction of the routes from Udorn to Nakhon Phanom and from Loey to Khonkaen is scheduled for 1966, as is the Lomsak-Saraburi Highway which is receiving assistance from the United States. Extension of major roads, as well as the improvement of lesser roads, is expected to open extensive new areas to agriculture and to contribute to the establishment of regional marketing centers within the region. Improvements in transportation, for example, are partly responsible for the increased production of kenaf. The road program is heavily dependent on foreign assistance, and the military benefits of part of the program are believed to make grant assistance appropriate for some of the construction. Australia and New Zealand, among other donors, are providing equipment and other assistance for road construction within the Colombo Plan.

Perhaps the most important single facet of the Northeast Plan, from both a short-run and a long-run point of view, is its attack on the serious water problems of the region. The flatness of the land results in damaging floods in the rainy season, and water supplies are inadequate in the dry season; because of limited sources of ground water, both aspects of the problem center on river control.

The water program combines construction of a few major dams with the building of many small storage tanks, or reservoirs. The program to build the latter dates back to before World War II but did not get under way on a large scale until the 1950's, when it was expanded with US aid. By the end of 1963, this program had resulted in construction of 133 tanks supplying a potential irrigable area of 52,000 hectares, of which two-thirds had been realized. 22/ An additional 6,500 hectares can be irrigated by five tanks that were constructed during 1964. Poor design and planning have made some of the tanks unsuccessful, but the program is highly regarded and is scheduled for further expansion.

Although the flatness of the terrain makes large dams infeasible in most of the Northeast, the few that are planned or under construction can substantially expand the extent of irrigable land. Scheduled for completion by the end of 1965 is the first phase of the Nam Pong Dam, which potentially can irrigate 29,000 hectares in the rainy season and 16,000 hectares in the dry season. 23/ This dam is a multipurpose project which ultimately can power a generating plant with a capacity of 25,000 kilowatts; two-thirds of this capacity is being installed initially, and Thailand plans to install the remainder soon to provide adequate capacity for power-sharing arrangements with Laos. It also is hoped the reservoir can form the basis of a fishing industry.

Another multipurpose project to be completed in 1965 or 1966 is the smaller Nam Pung Dam to provide power, irrigation, and flood control. Three additional dams scheduled for completion in 1967 and 1968 will provide potential irrigation for 41,000 hectares in the dry season and 61,000 hectares in the wet season.

The solution of the water problem in the Northeast is perhaps the most important single contribution that the government's development effort can make to improve agricultural conditions in the region. Freedom from damaging floods, as well as a more reliable and plentiful supply of water, should prove of great benefit to expansion and diversification of agriculture. The potential of such efforts by themselves, however, is limited. For example, the total irrigable land served by completed and presently planned tank and dam projects is less than 324,000 hectares, about 8 percent of land presently under cultivation in the Northeast. Furthermore, much of the potentially irrigable land is already under cultivation, so that increases in production are by no means directly proportional to expansion of irrigation, in spite of the double cropping that will be possible in many cases.

In addition to undertaking such major construction projects as those mentioned above, the Northeast Plan includes many programs that eventually will have important indirect effects on the economy of the Northeast. Health programs are being expanded, and so is the educational system. Better facilities for secondary education are being provided to increase the percentage of Northeast students who complete preuniversity training from 6 percent of the national total in 1961 to 10 percent by 1966. An institute for higher education being built in the Northeast will stress those fields of study that would serve the needs of the region in order to encourage its graduates to work within the region rather than elsewhere. Eventual expansion of this institute into the University of the Northeast is planned.

The development plan also makes provisions for such basic programs as resource surveys and agricultural research. Knowledge of the resources of the region is still limited, and studies of land use, mineral resources, water resources, soil conditions, forest reserves, industrial potential, and marketing and distribution are all required. Adequate study of these matters is essential to intelligent planning in the Northeast and will require several years to complete under the most favorable conditions. As it is, the resources, both financial and manpower, are too limited to permit the completion of these programs for many years. Foreign technical assistance is being exploited where possible, such as in the feasibility study of the Mun and Chi River Valleys being conducted by the US Bureau of Reclamation.

Basic research also must be applied to the problems of improving agricultural methods and materials, and this also is part of the Plan. Farmers in the Northeast and elsewhere in Thailand have responded to promising changes in cultivation, as shown in the increased growing

of maize encouraged by development of a new hybrid grain well suited to Thailand's agricultural conditions. Programs are being carried out to control rice diseases, to develop better varieties of rice and other crops, and to develop the use of fertilizers. Effective patterns of cultivation and crop rotation also are to be developed. It is hoped that by demonstrating the benefits to be derived from changing traditional cultivation habits, the farmers can be motivated to undertake more productive practices. Of necessity these are long-range programs, and, together with water control, they are the keys to agricultural improvement in the Northeast.

Overall, the development program of the Thai government for the Northeast is well designed to attack the problems of the area. It is recognized, however, that, given the low base from which the development programs can build, the present Plan effort will not produce tangible results for most individual farmers for some years. To meet the immediate need to make a favorable political impact in the Northeast, an imaginative MDU program for civic action was established in 1962 under the Defense Ministry with US aid. ^{24/} The objectives of the program include dispensing medical aid, conducting propaganda activities, and promoting public welfare and community development at the village level. Specific activities include road improvement on a limited scale, digging of wells, and introducing improved seeds and agricultural techniques. In the first phase of the program, teams of about 17 persons with a variety of skills move through the villages in an assigned area for about six weeks, establishing rapport with the villagers, evaluating local needs, and initiating related activities. A second phase of follow-up activity, in which model villages are set up and the larger projects are carried out, has encountered problems as a result of inadequate planning and resources. (An Accelerated Rural Development Program, initiated in 1964 with US aid, should help to remedy some of these shortcomings.) In a third phase of the MDU program, responsibility is turned over to local authorities. The MDU program at present is far too limited to contact more than a very small share of the Northeast villages, but it has been well received by the villagers. As a project to combine the political, social, and economic efforts in the region, it represents a promising part of the overall development program.

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VI. Northeast and Mekong River Basin Project

In 1957, Thailand joined Laos, Cambodia, and South Vietnam in forming the Committee for Coordination of Investigations of the Lower Mekong River Basin, or the Mekong Committee. The Committee has the task of coordinating national and international efforts to develop the navigational, agricultural, and industrial potential of the waters of the Mekong and its tributaries. To date, the Committee has been engaged primarily in conducting the many hydrologic, mapping, economic, and other studies required for planning the major construction projects and the economic activities that they will make possible. The Northeast of Thailand will derive its share of the potential benefits of these programs. Construction so far has been limited to tributary projects, which for Thailand have been the Nam Pong and Nam Pung Dams. ^{25/} Foreign assistance has been given for these as for other individual projects. Japan, for example, helped in the planning stages, and Pakistan planned the Nam Pong irrigation system. West Germany extended a \$12.6 million long-term loan to finance part of the Nam Pong construction cost, and the United Nations Special Fund is aiding an experimental farm project in connection with Nam Pung.

Thailand also is involved in the Nam Ngum tributary project in Laos, north of Vientiane. Planned as a 120,000-kilowatt power project in its final form, combined with irrigation works, Nam Ngum was originally intended to have a 20,000-kilowatt plant in its initial stage, and Thailand was to purchase about 20 percent of the power output. Recently it was proposed to increase the first stage installation to 60,000 kilowatts, but Thailand's reluctance to commit itself to purchase up to two-thirds of the power output resulted in a final plan to install 30,000 kilowatts. The Northeast is not presently involved in this proposed Thai purchase, except that the transmission line to Bangkok will cross the region and become part of its power distribution network. Nam Pong capacity, however, will be increased to its final capacity of 25,000 kilowatts to provide sufficient capacity for Lao purchase of Nam Pong power for use in Vientiane until 1971, when Nam Ngum power is available for the Vientiane area and for transmission to Thailand.

Although construction of mainstream projects and completion of the overall program is still many years in the future, the Northeast has a high stake in its realization. Two of these projects will have a direct impact on the region. ^{26/} The Pa Mong is the largest of the proposed Mekong projects. To be located upstream from Vientiane, Laos, where the Mekong is still the boundary with Thailand, this dam can potentially power an electric generating plant of 1 million kilowatts. Power in such quantities will long be far in excess of area requirements, but the dam reservoir, with a capacity two and one-half times that of Lake Meade behind Hoover Dam in the United States, will potentially provide irrigation for 1 million hectares, 800,000 of these in the

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Northeast of Thailand. Furthermore, it is believed that water can be diverted from Pa Mong to Nam Pong to increase the potential of the latter. A third-priority mainstream project at Khemmarat, north of the point at which the Mun River flows into the Mekong, also would provide power and water for irrigation of benefit to the Northeast.

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